$$A \rightarrow X$$
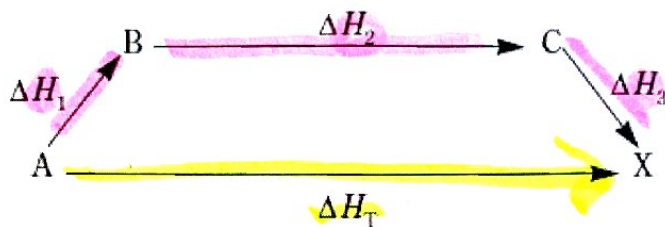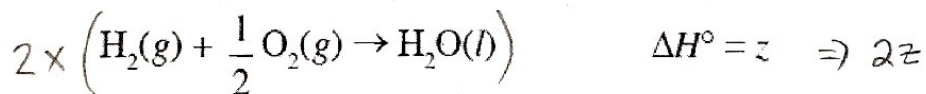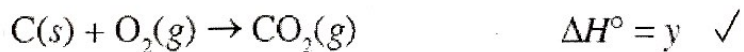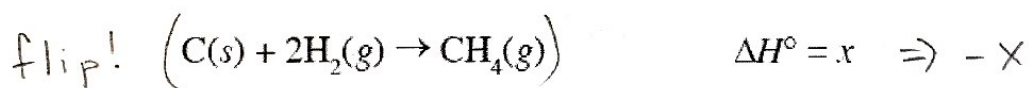
4. The enthalpy change for the reaction represented above is ΔH_T. This reaction can be broken down into a series of steps as shown in the diagram:

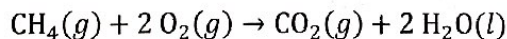

A relationship that must exist among the various enthalpy changes is:

(A) $\Delta H_T - \Delta H_1 - \Delta H_2 - \Delta H_3 = 0$ **C** $\Delta H_3 - (\Delta H_1 + \Delta H_2) = \Delta H_T$

B $\Delta H_2 - (\Delta H_3 + \Delta H_1) = \Delta H_T$ **D** $\Delta H_T + \Delta H_1 + \Delta H_2 + \Delta H_3 = 0$

$\rightarrow$ b/c $\Delta H_T = \Delta H_1 + \Delta H_2 + \Delta H_3$

flip! $\left(C(s) + 2H_2(g) \rightarrow CH_4(g) \right)$ $\Delta H° = x \Rightarrow -X$

$C(s) + O_2(g) \rightarrow CO_2(g)$ $\Delta H° = y \checkmark$

$2 \times \left(H_2(g) + \dfrac{1}{2} O_2(g) \rightarrow H_2O(l) \right)$ $\Delta H° = z \Rightarrow 2z$

5. Based on the information given above, what is $\Delta H°$ for the following reaction?

$$CH_4(g) + 2 O_2(g) \rightarrow CO_2(g) + 2 H_2O(l)$$

a. $x + y + z$

b. $x + y - z$

c. $y + z - 2x$

(d.) $y + 2z - x$